

REMARKS

Claims 1, 2, and 11-21 are amended for purposes of expediting prosecution. Support for the amendments is provided by the example embodiments shown in FIG. 4, and described in paragraphs [0016], [0019], [0020], [0026], and [0047], for example. Claims 1-21 are pending in this application. Reconsideration and allowance of the application are respectfully requested.

Patentable subject matter

Claims 11-21 are understood to be directed to statutory subject matter of 35 USC §101 and the rejection is respectfully traversed. The rejection of claims 11-20 is moot in view of the amendments to claims 11-20.

As to claim 21, it is an apparatus claim in means-plus-function form. As explained in MPEP 2181, “the PTO may not disregard the structure disclosed in the specification corresponding to such language when rendering a patentability determination.” *In re Donaldson Co.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994). The claim is not “software per se” as suggested by the Examiner. The specification clearly sets forth structure that is sufficient to make the claimed invention statutory subject matter. As described in paragraph [0047] and shown in FIG. 4, for example, “a computing arrangement 400 is shown for profiling thread CPU time according to embodiments of the present invention.” The computing arrangement provides the claimed means for performing the functions stated in claim 21. Therefore, the rejection of claim 21 is improper and should be withdrawn.

Definiteness

The rejection of claims 1-10 and 17 under 35 U.S.C. §112, second paragraph, as being indefinite is respectfully traversed.

The “selected value” recited in claim 1 is thought to be reasonably clear. In the example embodiment described in paragraph [0040], the epsilon value may be a constant or a variable value. Paragraphs [0031]-[0033] describe alternative approaches for selecting an epsilon value. Therefore, the terminology is thought to be reasonably definite to one skilled in the art.

The “each elapsed time” recited in claim 1 is thought to be reasonably clear. Claim 1 makes clear that only a single thread is referenced: the preamble calls out “a thread”, and the first “determining” step recites “determining elapsed times between execution points of the thread.” Thus, there is only one thread referenced and there is no apparent basis for indefiniteness.

The claim 1 step of “reducing to a selected value each elapsed time during which the thread was idle” is thought to be reasonably clear. However, this step is amended for purposes of expediting prosecution.

Claim 2 is understood to be reasonably clear. However, the preamble is simplified for ease of understanding. Also, the two additional “reducing” steps of claim 2 that comprise the “reducing” step of claim 1 set forth two different circumstances under which an elapsed time is reduced. The reducing step of claim 1 sets forth the general circumstance of the thread determined to be idle. In the first reducing step of claim 2 each elapsed time that exceeds a second threshold value, where the second threshold value is greater than the first threshold value, is reduced. And in the second reducing step of claim 2 each elapsed time that exceeds the first threshold value and does not exceed the second threshold value is reduced if a condition was detected that indicates the thread was idle during each elapsed time. Thus, the reducing steps of claim 2 set forth more particular aspects of the reducing step of claim 1.

As to claim 5, it is understood to be reasonably clear as written. The stated reason for the indefiniteness is “it is not clearly understood if the second threshold value change [sic] based on each thread maximum- length instruction path between execution points of the thread.” Applicant does not understand the Examiner’s stated reason. The method step simply sets forth what the second threshold value is. That is, the second threshold value is determined based on a maximum-length instruction path between execution points of the thread. Thus, there is no apparent indication by the claim language that the value is changed as the Examiner’s stated reason suggests. Paragraph [0026] describes the maximum-length instruction path. Therefore, claim 5 is reasonably clear and no amendment is necessary.

As to claim 17, it is amended to correct an inadvertent error.

Non-obviousness

Claims 1-4, 6 and 8-14, 16, and 18-21 are understood to be patentable under 35 USC §103(a) over “Aoshima” (U.S. Patent No. 5,774,718 to Aoshima et al.) in view of “Ballantyne” (U.S. Patent Pub. 2002/0078121 to Ballantyne). The rejection is respectfully traversed because the Office Action does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of Aoshima with teachings of Ballantyne.

The teachings of Aoshima do not substantially teach the limitations of claim 1, which sets forth: determining elapsed times between execution points of the thread based on start times and stop times associated with the execution points; determining for each elapsed time whether the thread was idle during the elapsed time by comparison of the elapsed time to a first threshold value; reducing to a selected value each elapsed time for which the thread was determined to be idle; and determining a value indicative of processor usage by the thread as a function of the elapsed times.

Aoshima neither teaches nor suggests the claimed “determining for each elapsed time whether the thread was idle during the elapsed time by comparison of the elapsed time to a first threshold value.”

Aoshima appears to use a substantially different method of determining whether a process is idle. Aoshima teaches, “The process action status monitoring unit monitors the time during which the respective processes are sleeping, that is to say, the idle time. If that idle time exceeds a certain threshold value, the cumulative CPU time used is cleared to 0.” (col. 2, lines 49-52). Thus, Aoshima actively monitors the time during which a process is idle and that monitoring produces the idle time. Claim 1, in contrast, uses a comparison of the elapsed time to the first threshold value for purposes of determining whether the thread was idle during that elapsed time. Aoshima knows by way of the monitoring whether a process is idle and measures that time. For claim 1, in contrast, a thread is not known to be idle during an elapsed time but is determined to be as such by way of comparison of the elapsed time to the first threshold value.

Ballantyne neither teaches nor suggests the limitations of “reducing to a selected value each elapsed time for which the thread was determined to be idle.” The Office Action asserts that Ballantyne’s “preempting the thread when the time portion expires

[sic] or giving up its unused time slot, is reducing the elapsed time and thread is waiting and cannot proceed is idle time as claimed.” Ballantyne’s preempting of a thread when the time portion expires, or the giving up its unused time slot is not reducing an elapsed time as claimed.

Each elapsed time for a thread is between execution points. Each elapsed time for the thread is determined based on a start time and a stop time between execution points of the thread. Each execution point is an instruction in program code. The claimed elapsed time is reduced if it is determined that during the elapsed time the thread was idle. In contrast, in preempting a thread Ballantyne knows the start time and the time at which the thread was preempted, and also the elapsed time between that start time and preemption time. From Ballantyne’s start time to the preemption time for a thread there is no idle time. Thus, there is no need for Ballantyne to reduce this elapsed time. In addition, there is no apparent suggestion by Ballantyne that an elapsed time is something that is determined based on the time between instructions in program code. Ballantyne shows allocation of time slots to threads (FIGs. 6-8). But there is no elapsed time that is determined, and therefore, there is no elapsed time to be reduced.

The asserted motivation for combining the teachings of Aoshima and Ballantyne is unsupported by evidence and improper. The Office Action states that “it would have been obvious ... to have combined the teaching [sic] of Aoshima and Ballantyne because Ballantyne’s teaching of reducing the elapsed time would improve scheduling techniques and increase CPU efficiency.” There is no evidence presented that indicates how Aoshima’s scheduling techniques are deficient without Ballantyne’s teachings. Nor is there any apparent evidence presented as to how Ballantyne’s teachings would increase Aoshima’s CPU efficiency. Furthermore, the Office Action explains the measure of CPU efficiency upon which the motivation is based. “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (*In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006)). Therefore, the asserted motivation is improper.

According to claim 2, first and second thresholds are used relative to the elapsed time to control the conditions under which the elapsed time is reduced to the selected value (“each elapsed time that exceeds a second threshold value” and “each elapsed time that exceeds the first threshold value and does not exceed the second threshold value if a condition was detected that indicates the thread was idle during each elapsed time”). The cited portion of Ballantyne does not suggest any apparent thresholds. Therefore, the Office Action has failed to show that Ballantyne suggests the limitations of claim 2. If the rejection is maintained, Applicant respectfully requests that the Examiner explain those elements of Ballantyne that are seen as corresponding to the claimed first and second thresholds.

Independent claims 11 and 21 include functional limitations similar to those of claim 1. Thus, the Office Action has not shown that the Aoshima-Ballantyne combination suggests the limitations of claims 11 and 21 for at least the reasons set forth above.

Claims 3 and 4 depend from claim 2, claims 6 and 8 depend from claim 1, and claim 9 depends from claim 8. Claims 12-14, 16, and 18-20 have claim 11 as a base claim. Thus, the Office Action has not shown that the Aoshima-Ballantyne combination suggests the limitations of claims 3, 4, 6, 8-9, 12-14, 16, and 18-20 for at least the reasons set forth above.

According to claim 10, “the execution points comprise entry points and exit points of functions called by the thread.” Ballantyne’s page 43, as cited by the Office Action, apparently shows a function. However, there is no indication that this illustrated function of Ballantyne is that for which an elapsed time is determined. Thus, the Office Action has not shown that the Aoshima-Ballantyne combination suggests the limitations of claim 10.

The rejection of claims 1-4, 6 and 8-14, 16, and 18-21 should be withdrawn because a *prima facie* case of obviousness has not been established.

Claims 5 and 15 are understood to be patentable under 35 USC §103(a) over the Aoshima-Ballantyne combination and further in view of “Kirk” (U.S. Patent No. 5,875,464 to Kirk). The rejection is respectfully traversed because the Office Action

does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of Aoshima with teachings of Ballantyne and Kirk.

According to claim 5, the method of claim 2 further comprises “determining the second threshold value based on a maximum-length instruction path between execution points of the thread.” The cited portion of Kirk teaches “Each node in the flow graph represents blocks of straight line code separated by arcs which indicate the program flow instructions. This flow graph is then used by the graph analysis algorithms in Module #4 to perform functions such as longest and shortest path determination.” (col. 10, lines 56-59). There is no apparent indication that Kirk’s longest path determination is in any manner used as a threshold for purposes of reducing an elapsed time. Thus, the Office Action has not shown that the Aoshima-Ballantyne-Kirk combination suggests all the limitations of claim 5. Since Ballantyne’s teachings are not substantially similar to the claimed invention, Applicant requests an explanation of the relevance of the cited portion of Ballantyne if the rejection is maintained.

The asserted motivation for combining Kirk with Aoshima and Ballantyne is unsupported by evidence and improper. The Office Action states that “it would have been obvious ... because Kirk’s teaching of basing the second threshold on the longest path of execution would improve CPU efficiency by determining the longest instruction path, one will be able to determine if there is some idle time, which will result on [sic] reducing the time slot given for the thread execution.” There is no evidence presented that supports the assertion that if one knows the longest instruction path one would be able to determine whether there is idle time. Nor is it apparent from the cited col. 10, lines 56-59 how this would result in a reduced time slot given for execution. Therefore, the asserted motivation is unsupported by evidence and improper.

If the Examiner is aware of portions of Kirk that are more relevant than the cited lines 56-59 of col. 10, Applicant respectfully requests citation to those portions.

Claim 15 includes limitations similar to those of claim 5. Therefore, the rejection of claims 5 and 15 should be withdrawn because a *prima facie* case of obviousness has not been established.

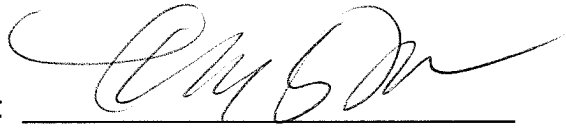
Claims 7 and 17 are understood to be patentable under 35 USC §103(a) over the Aoshima-Ballantyne combination and further in view of "Xu" ("Dynamic instrumentation of threaded applications", ACM, 1999, pages 49-59 to Xu et al.). The rejection is respectfully traversed because the Office Action does not show that all the limitations are suggested by the combination and does not provide a proper motivation for modifying the teachings of Aoshima with teachings of Ballantyne and Xu.

Claim 7 depends from claim 1, and Xu does not suggest the limitations of claim 1 that, as explained above, are not shown to be suggested by the Aoshima-Ballantyne combination. Thus, the Office Action has not shown that the limitations of claim 7 are suggested by the Aoshima-Ballantyne-Xu combination. Furthermore, the asserted motivation for combining the teachings is unsupported by evidence and improper. Claim 17 includes limitations similar to those of claim 7. Therefore, a *prima facie* case of obviousness has not been established, and the rejection should be withdrawn.

Withdrawal of the rejections and reconsideration of the claims are respectfully requested in view of the remarks set forth above. No extension of time is believed to be necessary for consideration of this response. However, if an extension of time is required, please consider this a petition for a sufficient number of months for consideration of this response. If there are any additional fees in connection with this response, please charge Deposit Account No. 50-0996 (HPCO.153PA).

Respectfully submitted,

CRAWFORD MAUNU PLLC
1270 Northland Drive, Suite 390
Saint Paul, MN 55120
(651) 259-2301

By: 
Name: LeRoy D. Maunu
Reg. No.: 35,274